1.

How Google Search Works

- Web pages,
- User-submitted content such as Google My Business and Maps user submissions,
- Book scanning,
- Public databases on the Internet,
- and many other sources.

  For changes to a single page, you can submit an individual URL to Google

- Get your page linked to by another page that Google already knows about. **However,** be warned that links in advertisements, links that you pay for in other sites, links in comments, or other links that don't follow the Google Webmaster Guidelines won't be followed.
- **If you ask Google to crawl only one page, make it your home page.** Your home page is the most important page on your site, as far as Google is concerned. To encourage a complete site crawl, be sure that your home page (and all pages) contain a good site navigation system that links to all the important sections and pages on your site; this helps users (and Google) find their way around your site.

Google doesn't accept payment to crawl a site more frequently, or rank it higher. If anyone tells you otherwise, they're wrong.

Indexing

After a page is discovered, Google tries to understand what the page is about. This process is called *indexing*. Google analyzes the content of the page, catalogs images and video files embedded on the page, and otherwise tries to understand the page. This information is stored in the *Google index*, a huge database stored in many, many (many!) computers.

To improve your page indexing:

- Create short, meaningful page titles.
- Use page headings that convey the subject of the page.
- Use text rather than images to convey content. (Google can understand some image and video, but not as well as it can understand text. At minimum, annotate your video and images with alt text and other attributes as appropriate.)

2.

When a networked device wants to broadcast, it transmits a data packet to the network's **broadcast address**. The network hardware, such as [routers](#) or [switches](#), does the work of sending the packet to every other device in the group. The group of eligible devices is called a **broadcast domain**.

This type of communication is also called **all-to-all**, because every device can transmit a message simultaneously to every other device.

Broadcast networking is supported by [IPv4](#), the network [protocol](#) used by most of today's Internet. However, the newer [IPv6](#) protocol [deprecates](#) broadcasting in favor of multicasting.

Broadcasting is one of the five major techniques for routing computer network traffic. The others are [unicast](#), [multicast](#), [anycast](#), and [geocast](#).

3. [Wi-Fi](#) networks announce themselves to all nearby [wireless](#) devices by **broadcasting** their [SSID](#). By broadcasting the SSID, it makes it easier for wireless devices to find a nearby network. It's the reason you see your neighbor's Wi-Fi network name when your device scans for an [access point](#).

Wi-Fi hardware can be configured not to broadcast an SSID. In this case, the Wi-Fi network is called a **hidden network**. Wireless devices can still connect to a hidden network if the user

One reason that IM has become so popular is its real-time nature. Unlike e-mail, where you will wait for the recipient to check his or her e-mail and send a reply, if a person you want to reach is online and available in your IM contact list, your message appears instantly in a window on their screen.

While IM is used by millions of Internet users to contact family and friends, it's also growing in popularity in the business world. Employees of a company can have instant access to managers and co-workers in different offices and can eliminate the need to place phone calls when information is required immediately. Overall, IM can save time for employees and help decrease the amount of money a business spends on communications.

While different IM clients offer slightly different features and benefits, the look and feel of an IM client is basically the same. Public IM clients and services available include

[ICQ](#), AOL Instant Messenger (AIM), Microsoft MSN Messenger, and Yahoo! Messenger. For businesses and enterprises looking for a more secure method of IM, there are enterprise IM packages available such as Microsoft Live Communication Server 2005 and IBM Lotus Instant Messaging. Third-party software is available to help businesses make using public IM services in the workplace more secure.

Some problems and issues associated with IM include spim and virus propagation. Spim is the IM equivalent of spam and is perpetuated by bots that harvest IM screen names off of the Internet and simulate a human user by sending spim to the screen names via an instant message. The spim typically contains a link to a Web site that the spimmer is trying to market. Spim is a bit more intrusive than spam due to the nature of IM itself. These advertisements and junk messages will pop-up in your IM window and you need to deal with the messages immediately, where with e-mail you can usually filter a lot of it out and deal with it later. Additionally, viruses and Trojans can be spread through IM channels. These malicious programs are usually spread when an IM user receives a message that links to a Web site where the malicious code is downloaded. The message will appear to be from a known IM contact, which is why recipients re more likely to click the hyperlink and download the file. Using safe chat rules (such as never clicking the link) and keeping an updated anti-virus program on your system will help reduce the chances of becoming infected by malicious programs being spread through instant messaging.

Internet Telephony & VoIP

Internet telephony consists of a combination of hardware and software that enables you to use the [Internet](#) as the transmission medium for telephone calls. For users who have free, or fixed-price Internet access, Internet telephony software essentially provides free telephone calls anywhere in the world. In its simplest form, [PC](#)-to-PC Internet telephony can be as easy as hooking up a microphone to your [computer](#) and sending your voice through a [cable modem](#) to a person who has Internet telephony software that is compatible with yours. This basic form of Internet telephony is not without its problems, however. Connecting this way is slower than using a traditional telephone, and the quality of the voice transmissions is also not near the quality you would get when placing a regular phone call.

E-mail

Short for electronic mail, e-mail is the transmission of messages over communications networks. The messages can be notes entered from the keyboard or electronic files stored on disk. Most mainframes, minicomputers and computer networks have an e-mail system. Some e-mail systems are confined to a single computer system or network, but others have gateways to other computer systems, enabling you to send electronic mail anywhere in the world.

Using an e-mail client (software such as Microsoft Outlook or Eudora), you can compose an e-mail message and send it to another person anywhere, as long as you know the recipient e-mail address. All online services and Internet Service Providers (ISPs) offer e-mail, and support gateways so that you can exchange e-mail with users of other systems. Usually, it takes only a few seconds for an e-mail to arrive at its destination. This is a particularly effective way to communicate with a group because you can broadcast a message or document to everyone in the group at once.

One of the biggest black clouds hanging over e-mail is spam. Though definitions vary, spam can be considered any electronic junk mail (generally e-mail advertising for some product) that is sent out to thousands, if not millions, of people. Often spam perpetrates the spread of e-mail Trojans and viruses. For this reason, it's important to use an updated anti-virus program, which will scan your incoming and outgoing e-mail for viruses.

For more information on e-mail, see "Deciphering Internet E-mail", a Webopedia Quick Reference.

IRC

Short for Internet Relay Chat, IRC is a multi-user chat system that allows to people gather on "channels" or "rooms" to talk in groups or privately. IRC is based on a client/server model. That is, to join an IRC discussion, you need an IRC client (such a m IRC) and Internet access. The IRC client is a program that runs on your computer and sends and receives messages to and from an IRC server. The IRC server, in turn, is responsible for making sure that all messages are broadcast to everyone participating in a discussion. There can be many discussions going on at once and each one is assigned a unique channel. Once you have joined an IRC chat room (chartroom discussions are designated by topics), you can type your messages in the public chartroom where all participants will see it, or you can send a private message to a single participant. With many IRC clients you can easily create your own chartroom and invite others to join your channel. You can also password protect your chartroom to allow for a more private discussion with just people whom you invite.

Once you become familiar with your IRC client you'll find many options available to help you moderate and take part in a channel. One problem commonly associated with IRC is lag. IRC relies on the connections between the servers, and the connections or the servers can slow down. If you're in a discussion and people do not respond, or you notice that people are responding to things you types several minutes ago, then you can attribute this to lag. If you continue to experience lag, you can try connecting to the IRC network on a different server.

Videoconferencing

Videoconferencing is a conference between two or more participants at different sites by using computer networks to transmit audio and video data. Each participant has a video

camera, microphone and speakers connected on his or her computer. As the two participants speak to one another, their voices are carried over the network and delivered to the other's speakers, and whatever images appear in front of the video camera appear in a window on the other participant's monitor.

In order for videoconferencing to work, the conference participants must use the same client or compatible software. Many freeware and shareware videoconferencing tools are available online for download, and most Web cameras also come bundled with videoconferencing software. Many newer videoconferencing packages can also be integrated with public IM clients for multipoint conferencing and collaboration.

In recent years, videoconferencing has become a popular form of distance communication in classrooms, allowing for a cost efficient way to provide distance learning, guest speakers, and multi-school collaboration projects. Many feel that videoconferencing provides a visual connection and interaction that cannot be achieved with standard IM or e-mail communications.

SMS & Wireless Communications

Short message service (SMS) is a global wireless service that enables the transmission of alphanumeric messages between mobile subscribers and external systems such as e-mail, paging and voice-mail systems. Messages can be no longer than 160 alpha-numeric characters and must contain no images or graphics. Once a message is sent, it is received by a Short Message Service Center (SMSC), which must then get it to the appropriate mobile device or system. As wireless services evolved, Multimedia Messaging Service (MMS) was introduced and provided a way to send messages comprising a combination of text, sounds, images and video to MMS capable handsets.

Communication on wireless devices such as mobile phones and PDAs is frequently changing. Today you can use your wireless device to not only make phone calls, but to send and receive e-mail and IM. While you can use e-mail, IRC or IM for free if you have an Internet account, you will end up paying fees to you mobile carrier to use these services on a wireless device.

3

There are two operating system design principles, which are: (1) **Separation of mechanism and policy** by implementing flexible mechanisms to support policies, and (2) **Optimization for common case:** Where will the OS be used? What will the user want to execute on that machine? What are the workload requirements?

There are three types of Operating Systems commonly used nowadays. The first is **Monolithic OS**, where the entire OS is working in kernel space and is alone in supervisor mode. The second is **Modular OS**, in which some part of the system core will be located

in independent files called modules that can be added to the system at run time. And the third is **Micro OS**, where the kernel is broken down into separate processes, known as servers. Some of the servers run in kernel space and some run in user-space.

Now let's get into those major concepts you need to understand in more detail.

1

- **Process State:** The current state of the process — whether it is ready, running, waiting, or whatever.

- **Process Privileges:** This is required to allow/disallow access to system resources.
- **Process ID:** Unique identification for each of the processes in the operating system.
- **Pointer:** A pointer to the parent process.
- **Program Counter:** Program Counter is a pointer to the address of the next instruction to be executed for this process.
- **CPU Registers:** Various CPU registers where processes need to be stored for execution for running state.
- **CPU Scheduling Information:** Process priority and other scheduling information which is required to schedule the process.
- **Memory Management Information:** This includes the information of page table, memory limits, and segment table, depending on the memory used by the operating system.
- **Accounting Information:** This includes the amount of CPU used for process execution, time limits, execution ID, and so on.
- **IO Status Information:** This includes a list of I/O devices allocated to the process.

2: Threads and Concurrency

A thread is a flow of execution through the process code. It has its own program counter that keeps track of which instruction to execute next. It also has system registers which hold its current working variables, and a stack which contains the execution history.

A thread shares with its peer threads various information like code segment, data segment, and open files. When one thread alters a code segment memory item, all other threads see that.

A thread is also called a **lightweight process**. Threads provide a way to improve application performance through parallelism. Threads represent a software approach to improving the performance of operating systems by reducing the overhead. A thread is equivalent to a classical process.

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